

E 9164

(Pages : 2)

Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2014

Third Semester

Core Course—ELECTRONICS

(Common for B.Sc. Physics Model I B.Sc. Physics Model II,
B.Sc. Physics—EEM, B.Sc. Physics Instrumentation)

[2013 Admissions]

Time : Three Hours

Maximum : 60 Marks

Part A (Short Answer Questions)

Answer all questions.

Each question carries 1 mark.

1. What is meant by ripple factor of a rectifier ?
2. What is a clipper ?
3. What is the significance of d.c. load line in transistor characteristics ?
4. What is known as the stability factor for a transistor ?
5. Why has potential divider method of biasing become universal ?
6. Why is emitter follower preferred to transformer for impedance matching ?
7. What is meant by modulation index ? What is its significance ?
8. What are the limitations of amplitude modulation ?

(8 × 1 = 8 marks)

Part B (Brief Answer Questions)

Answer any six questions.

Each question carries 2 marks.

9. Explain how zener diode maintains constant voltage across the load.
10. Explain the working of a voltage doubler with a circuit diagram.
11. Write a short note on junction capacitance of a PN-junction.
12. Define α of a transistor? Show that it is always unity.
13. Briefly describe the working principle of MOSFET.
14. Mention the essentials of a biasing circuit.
15. Draw the AM diode detector circuit and explain its action.
16. What are the characteristics of an ideal op-amp ?

Turn over

17. Explain the working of a Hartley oscillator with neat diagram.
18. Define the terms (i) frequency deviation ; (ii) carrier swing and (iii) deviation ratio.

(6 × 2 = 12 marks)

Part C (Problem/Descriptive)

*Answer any four questions.
Each question carries 4 marks.*

19. The four diodes have 1Ω forward resistance and infinite reverse resistance in a full wave bridge rectifier. The alternating supply voltage is 240_{rms} and load resistance is 480Ω . Calculate :
(i) mean load current and (ii) power dissipated in each diode.
20. Explain the basic idea of a clamper circuit. Draw the circuit diagram of a positive and negative clamper.
21. A class A power amplifier has a transformer as the load. If the transformer has a turn ratio of 10 and the secondary load is 100Ω , find the maximum power output. Given that zero signal collector current is 100mA .
22. Derive an expression for the fraction of total power carried by the sidebands in amplitude modulation.
23. Determine the (i) operating frequency and feedback fraction for a Colpitts oscillator. If the tank circuit capacitors are $0.001\mu\text{F}$ and $0.01\mu\text{F}$ and $L = 15\mu\text{H}$.
24. Determine the input impedance of a CE transistor amplifier circuit using potential divider bias method if $R_1 = 45\text{k}\Omega$, $R_2 = 15\text{k}\Omega$, $R_E = 7.5\text{k}\Omega$, $R_C = 10\text{k}\Omega$, $V_{CC} = 30\text{V}$ and $\beta = 200$.

(4 × 4 = 16 marks)

Part D (Long Answer / Problem Questions)

*Answer any two questions.
Each question carries 12 marks.*

25. What is a filter circuit ? Describe the action of the various filter circuit with neat diagram.
26. What is an operational amplifier ? Explain the application of operational amplifiers as ; (i) inverting amplifiers ; (ii) non-inverting amplifier ; (iii) unity follower ; (iv) summing amplifier.
27. Draw the input and output characteristics of CE connection. What do you infer from these characteristics ? Design an experiment to determine characteristics.
28. Give the principle of feedback in amplifiers. Discuss the positive and negative feedback with its effect. Give the block diagram of different types of feed back.

(2 × 12 = 24 marks)